METALLURGIA — INDEX TO VOLUME 57

JANUARY — DECEMBER 1990

A

Aerospace Forgings Ltd — new forge provides greater efficiency and service ... 462
Aerospace investment castings — present and future ... 474
Aerospace Technology — Equipment, materials and process advances ... 307
Automatic multi-purpose forming system ... FS3

B

BIFCA and the challenge of the 90's ... 328
Brass billet heating furnace installed ... 348
British Industrial Fastener Federation — involvement in the industry ... 354
British Forging Industry Association ... 333
Burner developments address environmental considerations ... 295

C

CAD/CAM and CAE in the British forging industry ... 32
Castings & Forgings '90 preview ... 408
Ceramic radiant tube furnace developments ... 340
Cold forging, export system to assist in design for manufacture by ... 454
Coldforming developments, advanced ... 449
Combustion technology — around the industry ... 296
Combustion update improves furnace performance ... 292
Computer control model for continuous reheat ... 412
Computer-aided engineering in the forging industry, from art to science ... 28
Contract services expanded in working difficult materials ... 271
Control and Instrumentation Exhibition preview ... 132
Control systems, advanced — helping UK steel efficiency ... 394
Control those energy costs painlessly ... 64
Copper alloys, advanced research & development of ... 350
Copper-based alloys — around the industry ... 353

D

Demand drivers in materials substitution ... 297
Design Engineering Show '90 — selective preview ... 400

E

Electric melting technology, latest, reviewed ... FU56
Energy cost comparison — gas-fired rapid heating furnace and an electric induction unit ... 284
Energy efficiency — recent developments ... 288
Equipment Advances in Thermal Processing ... 18
Equipment technology, developments in ... 378
Extrusion die developments ... 479

F

Farnborough International '90 — show preview ... 305
Flexible forging line ... 22
Fluidised bed furnaces offer process flexibility ... F14
Forge technology, BFIA annual conference addresses key area of ... 490
Forging — Around the industry ... 24
Forging equipment buyers guide ... FS18
Forging inspection line, new, on stream at Garrington's ... 460
Forging into the 21st Century — XIII International Congress, New Delhi ... 119
Forging Lubricants, water based, safety and environmental considerations ... 54
Forging Technology, around the industry ... 463
Forging, controlling the process and achieving fast tool changes ... FS6
Forging, news and developments around the industry ... FS10
Forgings for cost effective performance, convert to ... 457
Furnace and foundry equipment showcase at Eurofour, french exhibition ... 184
Furnace boost for galvanised coatings ... FUS10
Furnace contracts for melting, holding, refining and reclamation ... 172
Furnace developments at British Gas Midlands Research Station ... FU52
Furnace equipment in action ... 80
Furnace plant modernisations boost energy savings in thermal process operations ... 286
Furnace refurbishment and conversion, cost-effective ... 72
Furnace technology and equipment in action ... FUS18
Furnaces equipment buyers guide ... FUS34
Furnaces '90 — Exhibition and Conference Review ... 208
Furnaces '90 Exhibition and Conference Preview ... 5

H

Heat-Treating Conference & Exposition, the 12th, preview ... 37
Heat-treatment equipment and techniques in action ... 143
Heat-treatment, PSA Nitrogen — an attractive alternative for metal heat-treaters ... 468
Heat-treat group invests in latest technology ... 66
Heat-treatment group advances on all fronts ... 142
High performance materials — Japanese developments highlighted ... 302
Hotwork gives RCB a green image ... 294
Howmet (UK)'s £1.6 million expansion programme ... 476

I

Induction melting furnaces show advantages in process applications ... 171
Industrial automation systems, open ... 392
Industrial environment, the — steadily getting cleaner ... 259
Infra-red temperature measurement improves quality ... 129
Innovative press concept wins acceptance ... 57
Investment casting, equipment and processes in action ... 477

L

Laboratory automation aids cost-cutting at major steelworks ... 187
Lightweight materials, process flexibility with latest range of ... 481
Liquid metal processing, atomic energy technology applied in ... 174
Lubricant technology — recent advances reviewed ... 421

M

Materials success — made from Sheffield Steel ... 58
'Material Testing '90' Exhibition — a preview ... 100
Mechanical handling into the 90's ... 492
Melting and holding — around the industry ... 176
Metal components in action ... 356
Metal finishing — around the industry ... 428
Metal finishing — the final process ... 426
Microprocessors in the heat-treatment industry ... 126

N

NDT technology boosts engineering insurance operations ... 374
Nett-shape heat-treatments, new vacuum furnaces and control systems for ... 228
Nitrogen, heat-treatment using on-site sources ... 138

O

Orbital cold forging process, growth of the 21
Ovens and furnaces — the way ahead ... 336
Oxygen analysis — a vital step towards controlling process efficiency ... 68

P

PM '90 Exhibition Preview — International shop window for the power metal industry ... 253
Powder Metallurgy — enhancing life and performance of tools and dies ... 169
Precision casting in action ... 186
Precision casting in action ... 183
Precision castings, developments in Japan and South Korea ... 182
Precision component technology, company combination is a frontrunner in ... 458
Precision forge production facility, university/industry collaboration leads to ... 322
Process Control & Instrumentation — around the industry ... 396
Product cleaning, the future of ... 426

Q

Quality Assurance, BS 5750 — the benefits and rigours of system implementation ... 370
Quality testing, equipment and development in ... 190
Quality via process control — BNF's prime objective ... 377
Queen's Awards 1990 — Awards for Export and Technological Achievement ... 265

R

R&D focus on existing and emerging technologies ... 300
Refractories, developments in ... 346
Refractory linings, improvements in ... 344
Refractory modules and fixings, new concepts for ... 342
Reheating furnace technology, developments in ... 416

S

SPC — or how numbers can enhance modern management ... 96
Steel laboratory plays key role in European expansion ... 372
Strategic technologies — Part 1, investing in ... 164
Strategic technologies — Part 2, investing in ... 210
Subcon '90 Exhibition preview ... 148
Surface technology developments at GKN Sankey Engineering Products ... 424

T

Titanium alloy turbine blades, improvement in fatigue strength ... 480
Titanium alloy, versatile, high-strength corrosion resistant ... 478
Titanium investment casting, total capability in ... 179

V

Vacuum brazing shows wide process potential ... 78
Vacuum furnaces adapt to industry's increasing demands ... 224
Vacuum metallurgy — a leading edge philosophy ... FUS8
Vacuum metallurgy boosts isothermal forging ... 450

X

X-ray spectrometry, shop floor ... 98

FS — Forging Supplement with June Metallurgia

FUS — Furnaces Supplement with December Metallurgia

AUTHOR INDEX

Ainscow, P. W. ... FUS10
Andrews, D. ... 64
Atkinson, M. ... 68
Bauer, A. ... FS3
Bayliss, R. ... 457
Bless, F. ... 228
Brazenall, M. ... 468
Campbell, K. G. ... 210
Campbell, K. G. ... 164
Croke, G. ... 424
Cunningham, A. ... 187
Dean, T. A. ... 322
Dean, T. A. ... 32
Edenhofer, B. ... 228
Flower, A. ... 297
Fowler, J. F. ... 224
Freeman, R. ... 295
Hall, E. ... 96
Halliday, W. ... 412
Hardy, M. ... 468
Hartley, P. ... 32
Hiethaar, I. ... 187
Hirsig, B. ... 449
Jones, H. D. ... 388
Kalmus, A. C. ... 182
Kirton, K. ... 72
Kosh, D. J. ... 21
Lengyel, B. ... 454
Mahmood, T. ... 454
Martin, G. D. ... 394
Millward, W. J. ... 426
Molloy, W. J. ... 474
Needham, G. R. ... 426
Noakes, W. ... 129
Pillinger, I. ... 32
Precious, C. J. ... 138
Ramsell, P. G. ... 214
Savage, C. T. ... 228
Scholz, G. ... 57
Scott, R. ... 22
Shergold, M. D. ... 322
Smith, T. ... 174
Sturcke, N. ... 297
Sturgess, C. E. N. ... 32
Tucker, N. ... 126
Vandermeiren, M. ... 468
Waluszewski, A. ... 78
Watson, A. ... 284
White, L. ... 294
White, A. ... 286
Wilkins, D. C. A. ... 142
Williamson, I. R. F. ... FS6
Willoughby, A. P. ... 54
Wilms, H. D. ... 57

METALLURGIA — INDEX TO VOLUME 57

JANUARY — DECEMBER 1990

A

Aerospace Forgings Ltd — new forge provides greater efficiency and service ... 462
Aerospace investment castings — present and future ... 474
Aerospace Technology — Equipment, materials and process advances ... 307
Automatic multi-purpose forming system ... FS3

B

BIFCA and the challenge of the 90's ... 328
Brass billet heating furnace installed ... 348
British Industrial Fastener Federation — involvement in the industry ... 354
British Forging Industry Association ... 333
Burner developments address environmental considerations ... 295

C

CAD/CAM and CAE in the British forging industry ... 32
Castings & Forgings '90 preview ... 408
Ceramic radiant tube furnace developments ... 340
Cold forging, export system to assist in design for manufacture by ... 454
Coldforming developments, advanced ... 449
Combustion technology — around the industry ... 296
Combustion update improves furnace performance ... 292
Computer control model for continuous reheat ... 412
Computer-aided engineering in the forging industry, from art to science ... 28
Contract services expanded in working difficult materials ... 271
Control and Instrumentation Exhibition preview ... 132
Control systems, advanced — helping UK steel efficiency ... 394
Control those energy costs painlessly ... 64
Copper alloys, advanced research & development of ... 350
Copper-based alloys — around the industry ... 353

D

Demand drivers in materials substitution ... 297
Design Engineering Show '90 — selective preview ... 400

E

Electric melting technology, latest, reviewed ... FU56
Energy cost comparison — gas-fired rapid heating furnace and an electric induction unit ... 284
Energy efficiency — recent developments ... 288
Equipment Advances in Thermal Processing ... 18
Equipment technology, developments in ... 378
Extrusion die developments ... 479

F

Farnborough International '90 — show preview ... 305
Flexible forging line ... 22
Fluidised bed furnaces offer process flexibility ... F14
Forge technology, BFIA annual conference addresses key area of ... 490
Forging — Around the industry ... 24
Forging equipment buyers guide ... FS18
Forging inspection line, new, on stream at Garrington's ... 460
Forging into the 21st Century — XIII International Congress, New Delhi ... 119
Forging Lubricants, water based, safety and environmental considerations ... 54
Forging Technology, around the industry ... 463
Forging, controlling the process and achieving fast tool changes ... FS6
Forging, news and developments around the industry ... FS10
Forgings for cost effective performance, convert to ... 457
Furnace and foundry equipment showcase at Eurofour, french exhibition ... 184
Furnace boost for galvanised coatings ... FUS10
Furnace contracts for melting, holding, refining and reclamation ... 172
Furnace developments at British Gas Midlands Research Station ... FU52
Furnace equipment in action ... 80
Furnace plant modernisations boost energy savings in thermal process operations ... 286
Furnace refurbishment and conversion, cost-effective ... 72
Furnace technology and equipment in action ... FUS18
Furnaces equipment buyers guide ... FUS34
Furnaces '90 — Exhibition and Conference Review ... 208
Furnaces '90 Exhibition and Conference Preview ... 5

H

Heat-Treating Conference & Exposition, the 12th, preview ... 37
Heat-treatment equipment and techniques in action ... 143
Heat-treatment, PSA Nitrogen — an attractive alternative for metal heat-treaters ... 468
Heat-treat group invests in latest technology ... 66
Heat-treatment group advances on all fronts ... 142
High performance materials — Japanese developments highlighted ... 302
Hotwork gives RCB a green image ... 294
Howmet (UK)'s £1.6 million expansion programme ... 476

I

Induction melting furnaces show advantages in process applications ... 171
Industrial automation systems, open ... 392
Industrial environment, the — steadily getting cleaner ... 259
Infra-red temperature measurement improves quality ... 129
Innovative press concept wins acceptance ... 57
Investment casting, equipment and processes in action ... 477

L

Laboratory automation aids cost-cutting at major steelworks ... 187
Lightweight materials, process flexibility with latest range of ... 481
Liquid metal processing, atomic energy technology applied in ... 174
Lubricant technology — recent advances reviewed ... 421

M

Materials success — made from Sheffield Steel ... 58
'Material Testing '90' Exhibition — a preview ... 100
Mechanical handling into the 90's ... 492
Melting and holding — around the industry ... 176
Metal components in action ... 356
Metal finishing — around the industry ... 428
Metal finishing — the final process ... 426
Microprocessors in the heat-treatment industry ... 126

N

NDT technology boosts engineering insurance operations ... 374
Nett-shape heat-treatments, new vacuum furnaces and control systems for ... 228
Nitrogen, heat-treatment using on-site sources ... 138

O

Orbital cold forging process, growth of the 21
Ovens and furnaces — the way ahead ... 336
Oxygen analysis — a vital step towards controlling process efficiency ... 68

P

PM '90 Exhibition Preview — International shop window for the power metal industry ... 253
Powder Metallurgy — enhancing life and performance of tools and dies ... 169
Precision casting in action ... 186
Precision casting in action ... 183
Precision castings, developments in Japan and South Korea ... 182
Precision component technology, company combination is a frontrunner in ... 458
Precision forge production facility, university/industry collaboration leads to ... 322
Process Control & Instrumentation — around the industry ... 396
Product cleaning, the future of ... 426

Q

Quality Assurance, BS 5750 — the benefits and rigours of system implementation ... 370
Quality testing, equipment and development in ... 190
Quality via process control — BNF's prime objective ... 377
Queen's Awards 1990 — Awards for Export and Technological Achievement ... 265

R

R&D focus on existing and emerging technologies ... 300
Refractories, developments in ... 346
Refractory linings, improvements in ... 344
Refractory modules and fixings, new concepts for ... 342
Reheating furnace technology, developments in ... 416

S

SPC — or how numbers can enhance modern management ... 96
Steel laboratory plays key role in European expansion ... 372
Strategic technologies — Part 1, investing in ... 164
Strategic technologies — Part 2, investing in ... 210
Subcon '90 Exhibition preview ... 148
Surface technology developments at GKN Sankey Engineering Products ... 424

T

Titanium alloy turbine blades, improvement in fatigue strength ... 480
Titanium alloy, versatile, high-strength corrosion resistant ... 478
Titanium investment casting, total capability in ... 179

V

Vacuum brazing shows wide process potential ... 78
Vacuum furnaces adapt to industry's increasing demands ... 224
Vacuum metallurgy — a leading edge philosophy ... FUS8
Vacuum metallurgy boosts isothermal forging ... 450

X

X-ray spectrometry, shop floor ... 98

FS — Forging Supplement with June Metallurgia

FUS — Furnaces Supplement with December Metallurgia

AUTHOR INDEX

Ainscow, P. W. ... FUS10
Andrews, D. ... 64
Atkinson, M. ... 68
Bauer, A. ... FS3
Bayliss, R. ... 457
Bless, F. ... 228
Brazenall, M. ... 468
Campbell, K. G. ... 210
Campbell, K. G. ... 164
Croke, G. ... 424
Cunningham, A. ... 187
Dean, T. A. ... 322
Dean, T. A. ... 32
Edenhofer, B. ... 228
Flower, A. ... 297
Fowler, J. F. ... 224
Freeman, R. ... 295
Hall, E. ... 96
Halliday, W. ... 412
Hardy, M. ... 468
Hartley, P. ... 32
Hiethaar, I. ... 187
Hirsig, B. ... 449
Jones, H. D. ... 388
Kalmus, A. C. ... 182
Kirton, K. ... 72
Kosh, D. J. ... 21
Lengyel, B. ... 454
Mahmood, T. ... 454
Martin, G. D. ... 394
Millward, W. J. ... 426
Molloy, W. J. ... 474
Needham, G. R. ... 426
Noakes, W. ... 129
Pillinger, I. ... 32
Precious, C. J. ... 138
Ramsell, P. G. ... 214
Savage, C. T. ... 228
Scholz, G. ... 57
Scott, R. ... 22
Shergold, M. D. ... 322
Smith, T. ... 174
Sturcke, N. ... 297
Sturgess, C. E. N. ... 32
Tucker, N. ... 126
Vandermeiren, M. ... 468
Waluszewski, A. ... 78
Watson, A. ... 284
White, L. ... 294
White, A. ... 286
Wilkins, D. C. A. ... 142
Williamson, I. R. F. ... FS6
Willoughby, A. P. ... 54
Wilms, H. D. ... 57